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MOUNTAIN PINE BEETLE SITUATION ON LONGMIRE AREA MOUNT RAINIER NATIONAL PARK July, 1944

Under a policy of restricting protection to intensively used recreational areas, the mountain pine beetle control program in Mount Rainier National Park has been very effective. During the period from 1930 to 1941, annual maintenance work kept losses to a minimum, especially on the White River and Longmire control areas. On March 27, 1941, Keen in "A Reappraisal of the Mountain Pine Beetle Control Program in Mount Rainier National Park" noted outbreak tendancies in the Longmire area and advised intensive control to curb this trend. Control that year was completed except for outlying areas, notably the group known as the Devil's Dream Group. In 1942, due to closure of the CCC program, no control was undertaken. Since then there has been no control and as a consequence the mountain pine beetle has increased around the nuclei of infestation and many new groups have developed until now an outbreak is in full progress. So far, infestation showed the greatest increase in 1943.

Current Situation

1944 Survey: A detailed survey to determine the exact status of the mountain pine beetle in white pine on the Longmire Area was made during the period from June 26 to July 1. This survey was prompted by the findings of Volz and Furniss who on April 25 noted that an aggressive infestation was in progress, as stated in a letter of May 15 to Superintendent Preston. The recent survey was made by Buckhorn and Furniss of the Bureau of Entomology and Plant Quarantine and rangers Heckman, Volz, and Biederman of the National Park Service.

Number of trees: A total of 2,234 trees in 17 groups ranging in size from 7 to 884 trees were marked and measured. A relatively small number of infested trees (approximately 104) in groups that could be fairly accurately estimated from "red top" counts were not visited. Probably there were enough trees missed in one way or another to make a grand total of 2,500 currently infested trees. On the accompanying map, which may be used as an overlay on the Mount Rainier

Quadrangle, are plotted all the trees located during the survey. Groups that were marked and counted are indicated by letter; see Table I for a summary of these groups by diameter classes. Estimates based upon "red top" counts are entered directly upon the map.

All trees that were marked contained overwintering brood of the 1943-1944 generation. These trees will be largely abandoned within the next month or so, for at the time of marking most of the brood was in the large larval stage with a considerable number of pupae and a few new adults also present. Hence, the only value of this count, so far as control is concerned, is to give an indication of about what to expect in the next generation. It is likely, in view of the large increase in 1943 and because of the large and vigorous beetle population on hand, that there will be a still further increase in the coming generation. This means that there will be more, rather than less, trees to treat should control be decided upon.

Types of trees: It is noteworthy that the infested trees are of two types that might loosely be designated as young-mature and mature. In the former category, the large groups on Rampart Ridge and on the slopes of Tumtum Peak are approximately 100 years old and occur in stands ranging from about 50 percent pine to nearly pure pine. These trees are small to moderate in size both as to diameter and height. Nearly all the other trees fall in the fully mature class and range in size from moderate to large. These larger trees occur as a minor element in stands comprising 90 to 95 percent of other species.

Control considerations

Values involved: Control presents several problems, the first of which is whether to undertake control at all now that three years have elapsed in which the beetles have been allowed to develop unhampered. Briefly, the question is whether the values to be protected justify renewal of control. The principal items at stake are the young and relatively pure stands of pine on Rampart Ridge and on the slopes of Tumtum Peak and the pines about Longmire Headquarters. An additional element with regard to the latter trees is the fact that considerable expenditures have been made to protect them from blister rust.

Area to be covered: The question has been raised as to whether the mountain pine beetle infestation that has developed on Rampart Ridge, and elsewhere in the vicinity of Longmire, is a direct threat to the pines that are being protected from blister rust. On this point there can be little doubt. Pine beetle infestation anywhere

on the Longmire control area, which is a natural one extending from Emerald Ridge to Pinnacle Peak and Reflection Lakes, is a direct threat to any mature pine wherever located on the area. The dispersion of these beetles is such as to make it a hopeless undertaking to protect part of the area and let the rest go. Thus, it is a case of all or none.

Area priorities: The most pressing need is to clean up the large groups on the southwestern portion of Rampart Ridge. Of almost equal importance, and also requiring immediate attention is the situation on the slopes of Tumtum Peak. Scattered infestation elsewhere on the control area should not be neglected, but can be sidetracked until the main centers are covered. An indication of the probable magnitude of the entire job is provided by the present infestation which consists of 1579 trees on the southwestern end of Rampart Ridge, 576 trees on the slopes of Tumtum Peak, and 183 widely scattered trees. Very likely there will be increases in the 1944-45 generation. And, likewise, the magnitude of control operations will increase in proportion to the length of time beyond one year required for complete coverage.

Avenues of attack: In the long run the most effective and least costly procedure would be direct control against the 1944-45 generation of beetles and to cover the entire protection area in one year. Such a course, followed by intensive cleanup the next year, should put the situation well in hand. Limitations of personnel and funds might make such a course impractical and so necessitate a selection of the more important units and a spreading out of control over a period of years.

Time for control: For practical reasons, it is now too late to do anything about the 1943-44 generation which will soon be leaving the infested trees. This fall, when the newly attacked trees begin to show up, would be a good time to start control, especially if there is to be an attempt to effect full coverage in one year. It is quite doubtful, in view of the acute labor shortage, whether all infested trees could be treated if control is delayed until next spring. At the very least a comprehensive survey should be made this fall.

Control Methods

Fell-Peel-Burn: There is some question as to the control method that would be most suitable. In the past the fell-peel-burn method has been used to good effect, but the special measures that have had

to be used in order to protect recreational values and to guard against the escape of fire have made the method time consuming and costly.

Oil Spraying: In recent years the Bureau of Entomology and Plant Quarantine, through the Forest Insect Laboratory at Coeur d'Alene, Idaho, has perfected an oil spraying method that compares favorably in cost with the fell-peel-burn method. This new method, which involves the use of orthodichlorobenzene and diesel oil in varying percentages, has the advantage of eliminating fire hazard and so can be used until fairly late in the season. In fact, it could be used for summer control should that be considered practical. The oil spraying method does, however, introduce some problems not inherent in the burning method. It necessitates advance purchase of oil in the required quantity, adequate packing facilities for transporting the oil, special equipment in the form of back packs with suitable spray nozzles, and finally and most important it requires careful training and close supervision of the treating crews. (Training and supervision can be provided by Bureau personnel and it is quite likely that the back pumps and spray attachments can be obtained on loan through the same agency. Orthodichlorobenzene can be obtained on priority only and so it would be necessary to anticipate needs and order well in advance of control).

Choice of method: Because of the broken topography and the scattered distribution of infestation on the Longmire area, it is doubtful whether the oil spraying method could be used effectively for all trees. It would be most useful on Rampart Ridge, somewhat less so on Tumtum Peak, and probably would be unsuitable for treatment of most of the outlying groups. Felling and burning could be applied to good advantage in the outlying groups.

Special considerations in the use of oil: There are a number of factors to be taken into account before purchasing oil. First of all, time of treatment will have a pronounced effect upon the relative amounts of orthodichlorobenzene and diesel oil to be purchased. For fall treatment four or six parts of diesel oil to one of orthodichlorobenzene are recommended; whereas, in the spring concentrations of ten or twelve parts of diesel oil to one of orthodichlorobenzene can be safely used. Between two and two and one-half gallons of the mixture will be required for treatment of the average tree. It would be safer to figure upon the basis of the higher figure. Finally, there is the number of trees to be treated. At present this can only be a hypothetical figure for the trees to be treated are not yet attacked. On Rampart Ridge and Tumtum Peak there is a combined total of 2155 trees infested by the 1943-44 generation. This number is likely to be increased considerably by the next generation of beetles. Probably it would be well to plan on at least 3000 trees for treatment on these two areas.

Cost of oil: Costs are also problematical. A year or two ago, diesel oil was obtained at $.10 per gallon and orthodichlorobenzene at $.70. Very likely prices of these materials have gone up since then.

Concerns handling orthodichlorobenzene: Among the concerns that have been able to supply orthodichlorobenzene in the past are the following:

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, N. Y. City.
Braun-Knecht-Heimann Co., 1400 16th St., San Francisco, Cal.
Dow Chemical Co., Midland, Mich.
E.I. duPont de Nemours & Co. (Inc.) Wilmington, Del.
Electro Bleaching Gas Co., 60 East 42nd St. New York City.
James Good Co., 2114 East Susquehanna Ave., Philadelphia, Pa.
Mallinckrodt Chemical Works, 3600 North Second St., St. Louis, Mo.
Moncanto Chemical Co., 1700 South Second St., St. Louis, Mo.
Solvay Sales Corp., 40 Rector St., New York City

Cost of control: It would of course, be desirable to know in advance exactly what control would cost; however, this is impossible for much depends upon the method to be used, the type of labor, the size and character of the operation, and other factors. Based upon past experience, it is reasonable to assume that for a rather large operation using either the fell-peel-burn or the oil spraying method the average cost per tree would be from $2.00 to $3.00. Cost of cleanup on the outlying areas would probably be somewhat higher.

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TABLE I: DIAMETER DISTRIBUTION OF INFESTED WHITE PINES BY GROUPS

DBH (inches)	Number of Trees																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	R	S	Total
6		14			6	1	2			1						2	3	29
8		115			39	9	4	4	4	5	2					5	10	197
10	2	181			66	37	10	15	22	12	3					16	31	395
12	1	203			81	52	33	18	21	19	1		1			29	37	496
14	5	165			102	42	26	37	14	15	3		2			39	23	473
16	3	124	3	1	51	16	23	32	4	14	1				1	28	12	313
18	2	55	3		30	4	14	27	1	10			1		2	28	4	181
20	2	19	5	1	6		8	10	1	4		4	1		1	14		76
22		6	4	1	1		2		1			1	1	4	2	2		25
24		2	2	1								3	1	2	3	2		16
26			3									5	1	4	1			14
28														3	3			6
30				1								1		3	3			8
32				2											2			4
34														1				1
Total	15	884	20	7	382	161	122	143	68	80	10	14	8	17	18	165	120	2,234

MAP SHOWING LOCATION OF INFESTED WHITE PINES ATTACKED BY THE 1943-44 GENERATION OF THE MOUNTAIN PINE BEETLE - - LONGMIRE AREA.